IN THE CLAIMS:

1. (Currently amended) A vehicle comprising:

a plurality of wheels;

an internal combustion engine having a drive shaft interconnected to drive at least one of the wheels;

a stator having a core and a plurality of ~~wires~~ conductors disposed on the core in a three-phase ~~winding~~ arrangement;

a flywheel-rotor apparatus ~~surrounding at least a portion of~~ disposed adjacent to the stator and interconnected with the drive shaft, the flywheel-rotor apparatus being operable to magnetically interact with the stator to produce a three-phase alternating current in the ~~wires~~ conductors, and to provide an inertia to the internal combustion engine;

~~a power circuitry~~ power circuitry electrically connected to the plurality of ~~wires~~ conductors, the power circuitry being operable to receive the three-phase alternating current and to controllably generate a single-phase alternating current; and

an electrical outlet electrically connected to the power circuitry, the electrical outlet being configured to receive the single-phase alternating current and make the single-phase alternating current available for use by an operator.

2. (Currently amended) A vehicle comprising:

a plurality of wheels;

an internal combustion engine having a drive shaft interconnected to drive at least one of the wheels;

a stator having a core and a plurality of ~~wires~~ conductors disposed on the core in a three-phase ~~winding~~ arrangement;

a flywheel-rotor apparatus ~~surrounding at least a portion of~~ disposed adjacent to the stator and interconnected with the drive shaft, the flywheel-rotor apparatus being operable to magnetically interact with the stator to produce a three-phase alternating current in the ~~wires~~ conductors, and to provide an inertia to the internal combustion engine;

~~a power circuitry~~ power circuitry electrically connected to the plurality of ~~wires~~ conductors, the power circuitry being operable to receive the three-phase alternating current and to controllably generate a single-phase alternating current the power circuitry including

a regulator that regulates the three-phase alternating current to a direct current,

a storage device that stores the direct current, and

an inverter that converts the direct current to the signal-phase alternating current; and

an electrical outlet electrically connected to the power circuitry, the electrical outlet being configured to receive the single-phase alternating current and make the single-phase alternating current available for use by an operator.

3. (Currently amended) A vehicle as set forth in claim 1 wherein the three-phase alternating current includes a high-voltage, three-phase alternating current,

wherein the single-phase alternating current includes a first-voltage, single-phase alternating current,

wherein the stator further includes a ~~low-voltage wire~~ low-voltage conductor disposed on the core, and

wherein the flywheel-rotor apparatus magnetically interacts with the ~~low-voltage wire~~ low-voltage conductor to produce a second-voltage, single-phase alternating current in the ~~low-voltage wire~~ low-voltage conductor.

4. (Original) A vehicle as set forth in claim 3 wherein the high-voltage, three-phase alternating current is greater than approximately two hundred volts peak-to-peak, and the second-voltage, single-phase alternating current is less than approximately fifty volts peak-to-peak.

5. (Currently amended) A vehicle as set forth in claim 3 wherein the power circuitry includes a first power circuitry, and

wherein the vehicle further comprises:

a second power circuitry electrically connected to the ~~low-voltage wire~~ low-voltage conductor, the second power circuitry being operable to receive the second voltage, single-phase alternating current and controllably generate a direct current.

6. (Original) A vehicle as set forth in claim 5 wherein the first-voltage, single-phase alternating current is between ninety and one hundred thirty five volts root-mean-square, and the direct current is between ten and fifty volts.

7. (Previously amended) A vehicle as set forth in claim 5 wherein the first-voltage, single-phase alternating current is approximately one hundred twenty volts root-mean-square, and the direct current is approximately twelve volts.

8. (Currently amended) A vehicle as set forth in claim 3 wherein the core includes a plurality of teeth, the total number of teeth being represented by (x) where (x) is an integer,

wherein the plurality of ~~wires~~ conductors are disposed on (n) teeth where (n) is an integer less than (x), and

wherein the ~~low-voltage wire~~ low-voltage conductor is disposed on (x - n) teeth.

9. (Currently amended) A vehicle as set forth in claim 3 wherein the core includes a plurality of teeth,

wherein the plurality of ~~wires~~ conductors are disposed on each of the teeth, and

wherein the ~~low-voltage wire~~ low-voltage conductor is disposed on at least one of the teeth.

10. (Currently amended) A vehicle as set forth in claim 1 wherein the power circuitry includes a first power circuitry,

wherein the three-phase, alternating current is a first three-phase, alternating current,

wherein the single-phase alternating current is a first signal-phase alternating current,

wherein the vehicle further comprises:

a second power circuitry having at least two connections interconnected with the plurality of ~~wires~~ conductors, at least one of the two connections being a tap off of one of the phases, the second power circuitry being operable to receive a second alternating current and to controllably generate a direct current.

11. (Original) A vehicle as set forth in claim 10 wherein the second alternating current is a single-phase current.

12. (Original) A vehicle as set forth in claim 10 wherein the second alternating current is a three-phase current.

13. (Original) A vehicle as set forth in claim 10 wherein the first single-phase alternating current is between ninety and one hundred thirty five volts root-mean-square, and the direct current is between ten and fifty volts.

14. (Original) A vehicle as set forth in claim 10 wherein the first single-phase alternating current is approximately one hundred twenty volts root-mean-square, and the direct current is approximately twelve volts.

15. (Currently amended) A vehicle as set forth in claim 10 wherein the second power circuitry has three connections to the plurality of ~~wires~~ conductors, each connection being a tap off of a distinct one of the phases.

16. (Currently amended) A vehicle as set forth in claim 1 wherein the power circuitry includes a first power circuitry,

wherein the three-phase alternating current is a first three-phase alternating current,

wherein the single-phase alternating current is a first single-phase alternating current,

wherein the vehicle further comprises:

a second power circuitry having at least two connections interconnected with the plurality of ~~wires~~ conductors, the second power circuitry being operable to receive a second alternating current and controllably generate a low-voltage direct current.

17. (Original) A vehicle as set forth in claim 16 wherein the second alternating current is a signal-phase alternating current.

18. (Original) A vehicle as set forth in claim 16 wherein the second alternating current is a three-phase alternating current.

19. (Original) A vehicle as set forth in claim 16 wherein the first single-phase alternating current is between ninety and one hundred thirty five volts root-mean-square, and the direct current is between ten and fifty volts.

20. (Previously amended) A vehicle as set forth in claim 16 wherein the first single-phase alternating current is approximately one hundred twenty volts root-mean-square, and the direct current is approximately twelve volts.

21. (Currently amended) A vehicle as set forth in claim 16 wherein the second power circuitry includes two connections interconnected with the plurality of ~~wires~~ conductors.

22. (Currently amended) A vehicle as set forth in claim 16 wherein the second power circuitry includes three connections interconnected with the plurality of ~~wires~~ conductors.

23. (Original) A vehicle as set forth in claim 16 wherein the first and second power circuitries are interconnected.

24. (New) A vehicle as set forth in claim 1 wherein the flywheel-rotor apparatus surrounds at least a portion of the stator.

REMARKS

Prior to this Amendment, claims 1-23 are pending in the application. In the pending Office action, the Examiner finally rejected claims 1-23 as being unpatentable in view of cited prior art. Applicants are amending claims 1-3, 5, 8-10, 15, 16, 21, and 22, and added claim 24. For claims 1 and 2, Applicants amended "wires" to "conductors" and amended the phrase "surrounding at least a portion of" to "disposed adjacent to," thereby broadening claims 1 and 2. Applicants amended claims 3, 5, 8-10, 15, 16, 21, and 22 from "wire[s]" to "conductor[s]," thereby broadening claims 3, 5, 8-10, 15, 16, 21, and 22. Applicants are also filing a Request for Continued Examination, submitting a Declaration of Robert E. Rose Sr., and traversing the Examiner's rejection. Reexamination and reconsideration in view of the Declaration and remarks contained herein are respectfully requested.

The Examiner rejected the application as being obvious over numerous references. More specifically, the Examiner rejected

- claims 1, 3-7, 9-14, and 16-23 as being unpatentable over U.S. Patent No. 4,853,553 (Hosie) in view of U.S. Patent No. 4,418,677 (Hofmann) and further in view of U.S. Patent No. 4,973,896 (Shiga et al.);

- claim 2 as being unpatentable over Hosie in view of Hofmann and U.S. Patent No. 5,698,905 (Ruthlein et al.) and further in view of Shiga et al.;

- claim 8 as being unpatentable over Hosie in view of Hofmann and Shiga et al., and further in view of U.S. Patent No. 5,072,714 (Bengtsson et al.);

- claim 15 as being unpatentable over Hosie in view of Hofmann and Shiga et al., and further in view of U.S. Patent No. 5,929,611 (Scott).

Amended claim 1 recites

> A vehicle comprising:
> a plurality of wheels;
> an internal combustion engine having a drive shaft interconnected to drive at least one of the wheels;

a stator having a core and a plurality of conductors disposed on the core in a three-phase arrangement;

a flywheel-rotor apparatus disposed adjacent to the stator and interconnected with the drive shaft, the flywheel-rotor apparatus being operable to magnetically interact with the stator to produce a three-phase alternating current in the conductors, and to provide an inertia to the internal combustion engine;

power circuitry electrically connected to the plurality of conductors, the power circuitry being operable to receive the three-phase alternating current and to controllably generate a single-phase alternating current; and

an electrical outlet electrically connected to the power circuitry, the electrical outlet being configured to receive the single-phase alternating current and make the single-phase alternating current available for use by an operator.

For establishing a *prima facie* case of obviousness, three basic criteria must be met. *M.P.E.P.* § 2143.

> First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

Applicants contend that the Examiner's proposed combination for claim 1 does not meet the *prima facie* case of obviousness.

The Hosie reference does not teach or suggest a vehicle including, among other things,

- a flywheel-rotor apparatus disposed adjacent to a stator and interconnected with the drive shaft, the flywheel-rotor apparatus being operable to magnetically interact with the stator to produce a three-phase altering current in the conductors, and to provide an inertia to the internal combustion engine; or

- an electrical outlet being configured to receive a single-phase alternating current and make the single-phase alternating current available for use by an operator.

The Examiner acknowledges the above assertion as shown on Page 3 of the pending action.[1]

Hosie also does not teach or suggest "an internal combustion engine having a drive shaft interconnected to drive at least one of a plurality of wheels." Rather, the Hosie reference

[1] For a further discussion of the above-cited elements, please refer to the Amendment dated April 22, 2003 pp. 8-9.

discloses a diesel-electric propulsion operating system for a trolley and diesel bus dual mode vehicle. See abstract, 1-6; and col. 4, lines 13-29. When the engine provides the power to the bus, the alternator 38 converts mechanical energy from the engine 34 into electrical power and the electrical power is used to drive the traction motor(s) 20 (and 44). Fig. 5; and col. 4, lines 30-46; col. 5, lines 44-63; and col. 6, lines 13-50. Therefore, the engine does not have a drive shaft interconnected to drive at least one of the wheels. Accordingly, the Hosie reference does not teach or suggest the subject matter of claim 1.

The Hofmann reference does not cure the deficiencies of the Hosie reference. The Hofmann reference also does not teach or suggest a vehicle including, among other things, "an electrical outlet electrically connected to the power circuitry, the electrical outlet being configured to receive the single-phase alternating current and make the single-phase alternating current available for use by an operator." The Examiner appears to acknowledge that Hosie lacks the previously quoted element as shown on Page 3 of the pending action.

It is also noted that the Hofmann reference does not teach or suggest a vehicle including, among other things,

- a stator having a core and a plurality of conductors disposed on the core in a three-phase arrangement; or

- a power circuitry electrically connected to the plurality of conductors, the power circuitry being operable to receive the three-phase alternating current and to controllably generate a single-phase alternating current.

Rather, the Hofmann reference discloses a stator mounted on an engine 10 including circumferentially spaced power coils 19 lying in a plane of and radially inward of a plurality of power magnets 20 mounted on an engine flywheel 12.

> As most clearly seen in Fig. 2, the power coils 19 are connected in two groups of five coils, with the coils in each group connected in electrical series. In the preferred embodiment each group of power coils is connected to a bridge circuit 29 made up of four diodes to provide full wave rectification. A switch 30 provided between the groups of coils allows them to be connected to the electrical load, represented by the battery 31 in Fig. 2, in either series or parallel relationship. With the switch 30 open as shown in Fig. 2, the groups of coils are

> connected in parallel with each bridge circuit 29 supplying direct current to the battery 31. With the switch 30 closed, the coils are effectively connected in series and the diodes 32, 33, 34 and 35 serve as a bridge circuit to rectify the current generated. A pair of shunt type voltage regulators 36, such as that described in the U.S. patent application of Staerzl, Ser. No. 06-059,054, filed on July 19, 1979 and assigned to the same assignee as this application, are connected across the [bridge] rectifier circuits 29 to provide regulated power to charge the battery 31.

Col. 3, lines 23-43.

Accordingly, the Hosie reference does not teach or suggest the subject matter of claim 1.

To overcome the deficiencies of the Hofmann and Hosie references, the Examiner combines the Hofmann and Hosie references with the Shiga et al. reference. The Shiga et al. reference discloses an automobile generator apparatus for producing commercial line power. Abstract, col. 13, lines 52-60.

However, it is noted that the Shiga et al. reference does not teach or suggest a vehicle including, among other things, "a flywheel-rotor apparatus disposed adjacent to the stator and interconnected with the drive shaft, the flywheel-rotor apparatus being operable to magnetically interact with the stator to produce a three-phase alternating current in the conductors, and to provide an inertia to the internal combustion engine." Rather, a pulley is used to couple the engine 2 to the generator 3. See Figs 1-3, 5. More specifically, Figs. 55-57 show the generator being coupled to the pulley 125, which is driven by a belt running between the generator and the automobile engine. Col. 57, lines 3-9, and 46-50. Accordingly, the Shiga et al. reference does not teach or suggest the subject matter of claim 1.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based in applicants' disclosure. *M.P.E.P.* §2143. The mere fact that the references can be combined does not render the resultant combination obvious unless the prior art suggests the desirability of the combination. *M.P.E.P.* § 2143.01. See also *M.P.E.P.* §2142 ("To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references. [Citations omitted].") "Determination of obviousness

cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention." *ATD Corp. v. Lydall, Inc.*, 159 F. 3d 534, 546 (Fed. Cir. 1998).

First, the Hosie reference does not provide any suggestion or motivation to combine with the Hofmann reference to teach the claimed invention. Rather, the Examiner argues that the Hofmann reference provides the motivation to combine the flywheel assembly of the Hofmann reference with the dual mode diesel electric power system of Hosie. However, as noted by Mr. Rose in point 13 of his Declaration, Hofmann, at best, provides motivation to combine her alternator, and not just the flywheel assembly, with the Hosie reference. Hofmann does not teach or suggest combining her alternator with a dual mode diesel electric power system to drive traction motors of a two-section bus/trolley. Instead, Hofmann teaches using her alternator to generate DC power for DC auxiliary electric equipment (e.g., lights, starter, and similar devices). That is, Hosie requires the alternator to provide sufficient electrical power to drive the traction motors, while Hofmann describes providing electrical power to charge a battery. Therefore, the Hofmann reference does not provide suggestion or motivation to combine with the Hosie reference to teach the claimed invention.

Even assuming that Hofmann does provide the proper motivation to combine the references, there is no reasonable expectation of success that the combination will work. As set forth by Mr. Rose in his Declaration, the Hosie system requires significant amount of power (at least 10-15 kilowatts) to be produced by the engine/generator combination to drive the traction motors and power all the accessories attached to the generator. It not practical to use the flywheel assembly of the Hofmann reference in the Hosie system to generate that much power. The flywheel assembly substantially encloses the stator windings and, therefore, only limited amounts of air can pass over the stator windings and the magnets of the flywheel assembly. If one uses the flywheel assembly in the Hosie system, the generator would overheat due to lack of cooling. Therefore, there is not a reasonable expectation of success if one combines the Hosie flywheel with the Hosie dual mode diesel electric power system for vehicles.

Similarly, the automobile generator apparatus of the Shiga et al. reference also does not have a flywheel-rotor apparatus to provide inertia to the internal combustion engine. Rather, the

Shiga et al. reference teaches away from using a flywheel-rotor apparatus by stating that the engine couples to the generator via a pulley arrangement. See Figs. 1-3, 5, 55-57; and col. 57, lines 3-9, and 46-50. Therefore, it would not be obvious to modify the automobile generator apparatus of the Shiga et al. reference with the flywheel assembly of Hosie.

Therefore, the Hosie reference does not provide suggestion or motivation to combine with the Hofmann reference, and the Hofmann reference does not provide suggestion or motivation to combine with the Hosie reference. Also, there is no reasonable expectation of success when combining the Hosie and Hofmann references, and the Shiga et al. reference teaches away from combining with the Hofmann reference. Accordingly, claim 1 is patentable over the combination of the cited references, and is allowable.

Claims 3-24 depend, either directly or indirectly, from claim 1, and consequently, include patentable subject matter for the reasons set forth above with respect to claim 1. Additionally, claims 3-24 specify additional elements and/or limitations that, in combination with claim 1, are believed to be inventive. Therefore, dependent claims 3-24 are allowable.

Claim 2 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Hosie in view of Hofmann, Ruthlein et al, and in further view of Shiga et al. Independent claim 2 includes all the limitations of claim 1 and, therefore, the discussion above for the Hosie, Hofmann, and Shiga et al. references apply equally to claim 2. Additionally, none of the Hosie, Hofmann, or Shiga et al. references include all the elements of the power circuitry. See point 5 of the pending Office action. Instead, the Examiner argues that the Ruthlein et al. reference cures the deficiencies of the Hosie, Hofmann, and Shiga et al. references.

The Ruthlein et al. reference does not teach or suggest a vehicle including, among other things,

- an internal combustion engine having a drive shaft interconnected to drive at least one of a plurality of wheels;

- a flywheel-rotor apparatus disposed adjacent to a stator and interconnected with the drive shaft, the flywheel-rotor apparatus being operable to magnetically interact with

the stator to produce a three-phase alternating-current in the conductors, and to provide an inertia to the internal combustion engine; or

- an electrical outlet being configured to receive the single-phase alternating current and make the single-phase alternating current available for use by an operator.

Rather, the Ruthlein et al. reference discloses a hybrid propulsion system for road motor vehicles such as an automobile or a bus. See col. 10, lines 36-57. The system includes a generator 7 coupled to an engine 5, which drives the generator 7. Col. 5, lines 67-75. Coupled to the generator is an electronic generator control system 13. The electronic generator control system 13 controls the electronic commutation and conversion of the currents generated by the generator 7 into direct current power for a direct current intermediate circuit 9. Col. 6, lines 53-57. A motor control system 11 is coupled to the direct current intermediate circuit 9. See Figs. 1 and 1A. The motor control system 11 converts direct current power from the direct current intermediate circuit 9 into alternating current for an electric motor 1. Col. 6, lines 19-30. The electric motor 1 drives one or more wheels 3. Col. 2, lines 62-67.

The engine 5 does not have a drive shaft interconnected to drive at least one of the wheels 3. Instead, the engine 5 includes a shaft for driving the generator 7, while each wheel 3 is driven by one or motors 1. See, e.g., col. 5, lines 63-67. Further, the Ruthlein et al. reference does not describe using a flywheel-rotor apparatus. Instead, the Ruthlein et al. reference only generically shows a generator 7. Additionally, the second alternating current signal created by the motor control system 11 is provided to the motor. There is no electrical outlet making a single-phase alternating current available for use by an operator. Therefore, the Ruthlein et al. reference does not teach or suggest the subject matter of claim 2.

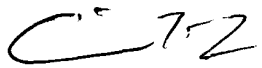
Further, the arguments against combining the Hofmann reference with the Hosie and Shiga et al. references as set forth in claim 1 also apply equally to claim 2. In addition, the arguments against combining the Hosie and Hofmann references apply equally to not combining the Ruthlein et al. and the Hofmann references. Specifically, Ruthlein et al. does not provide any suggestion of combining with the flywheel apparatus of Hofmann, Hofmann does not provide any suggestion of using her alternator to power motors for driving wheels of a vehicle, and there is not a reasonable expectation of success for the combination of the Hofmann flywheel

apparatus with the Ruthlein et al. hybrid propulsion system since the power requirements of the Ruthlein et al. system are significant. Accordingly, claim 2 is patentable over the combination of the cited references.

CONCLUSION

Entry of the Amendment and allowance of claims 1-23 are respectfully requested. The undersigned is available for telephone consultation at any time during normal business hours.

Respectfully submitted,



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